National Institute of Environmental Health Sciences

Are Arctic Ocean ecosystems exceptionally vulnerable to global emissions of mercury? A call for emphasised research on methylation and the consequences of climate change

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Abstract:

Emissions, atmospheric transport and deposition have formed the emphasis of recent research to understand Hg trends in Arctic marine biota, with the expressed objective of predicting how biotic trends might respond to emission controls. To answer the question of whether the Arctic Ocean might be especially vulnerable to global mercury (Hg) contamination and how biota might respond to emission controls requires a distinction between the supply of Hg from source regions and the processes within the Arctic Ocean that sequester and convert mercury to monomethyl Hg (MeHg). Atmospheric Mercury Depletion Events (AMDEs) provide a unique Hg deposition process in the Arctic; however, AMDEs have yet to be linked quantitatively with Hg uptake in marine food webs. The difficulty in implicating AMDEs or emissions to biotic trends lie in the ocean where several poorly understood processes lead to MeHg production and biomagnification. We propose that sensitivity of the Arctic Ocean's ecosystem to Hg lies not so much in the deposition process as in methylation processes within the ocean, Hg inputs from large drainage basins, and the vulnerability these to climate change. Future research needs to be better balanced across the entire Hg cycle.

Source: http://dx.doi.org/10.1071/en09127

Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Quality, Food/Water Quality, Other Exposure

Food/Water Quality: Chemical, Other Water Quality Issue, Other Food Quality

Water Quality (other): Mercury

Food Quality (other): Mercury

Geographic Feature: ☑

resource focuses on specific type of geography

Arctic, Ocean/Coastal

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

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